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E-TRAINING QUALITY AND KNOWLEDGE MANAGEMENT IN JORDANIAN TELECOMMUNICATIONS: THE MEDIATING ROLE OF INTRINSIC MOTIVATION

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Abstract

This study investigates the relationship between e-training quality and knowledge management within the Jordanian telecommunications sector, emphasizing the mediating role of intrinsic motivation. E-training quality is described as a multidimensional construct that includes instructor quality, content quality, and digital infrastructure quality. A quantitative cross-sectional survey targeting employees from three telecommunications firms in Jordan yielded 355 valid responses, analyzed through partial least squares structural equation modeling (PLS-SEM) using SmartPLS 4. The results indicatea positive association between e-training quality and intrinsic motivation, as well as with the four explored knowledge management processes: knowledge acquisition, knowledge application, knowledge storage, and knowledge sharing. Notably, intrinsic motivation is positively linked to knowledge acquisition, storage, and sharing, but was not significantly associated withto knowledge application. Mediation analysis reveals that intrinsic motivation acts as a significantly mediated in the relationships between e-training quality and knowledge acquisition, storage, and sharing, while no significant mediation is detected for knowledge application. predictive relevance and multigroup differences and indicate that certain structural relationships vary across the three participating companies. The findings underscore the necessity of considering e-training quality and intrinsic motivation as interlinked factors in comprehending knowledge management processes in telecommunications organizations.

Keywords: E-Training Quality; Knowledge Management; Intrinsic Motivation; Telecommunications; PLS-SEM; Jordan.

1. INTRODUCTION

Digital transformation has fundamentally altered the ways organizations generate, acquire, share, and utilize knowledge, enhancing the significance of knowledge management (KM) for both organizational learning and performance (Abubakar et al., 2019; De Bem Machado et al., 2022). This relevance is particularly pronounced in the telecommunications sector, where the pace of technological advancement necessitates ongoing employee education and the effective application of knowledge within workplace practices (Xia et al., 2024). Within the context of organizational learning, e-training has emerged as a crucial mechanism that facilitates flexible access to learning resources and encourages interaction in digital environments. Research indicates that the effectiveness of e-training is influenced not only by its accessibility but also significantly by the quality

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of its instructional design, content, and technological components. The interplay of these dimensions is essential in shaping employees' learning experiences and enhancing their engagement with organizational knowledge.

Despite the increasing use of e-training, the relationship between e-training quality and specific knowledge-management processes is not well understood (Soltani et al., 2020; Zahari et al., 2020). Prior studies have frequently focused on e-training effectiveness regarding overall learning outcomes or employee performance, but have paid less attention to how e-training quality may distinctly affect various stages of knowledge management. Knowledge acquisition, storage, sharing, and application are conceptually different processes that may react differently to training and motivational strategies.

A gap exists in understanding the motivational mechanisms affecting employee engagement with e-training resources. Employees' intrinsic motivation, as explained by Self-Determination Theory (SDT), may influence their involvement in learning activities. However, the consistency of this motivational mechanism across various knowledge-management processes is not well-established. This study applies the SDT perspective without directly testing its fundamental needs: autonomy, competence, and relatedness.

To fill the identified gaps, the study defines E-Training Quality (ETQ) as a higher-order construct comprising Instructor Quality, Content Quality, and Digital Infrastructure Quality. It explores ETQ's relationships with four key knowledge-management processes: Knowledge Acquisition, Knowledge Storage, Knowledge Sharing, and Knowledge Application, and examines the mediating role of Intrinsic Motivation across these processes.

The study investigates employees in the Jordanian telecommunications sector, emphasizing the significance of continuous learning, digital training, and knowledge exchange. It differentiates knowledge-management processes and explores intrinsic motivation as a mediating mechanism to elucidate how e-training quality impacts organizational knowledge management.

2. LITERATURE REVIEW

2.1 Self-Determination Theory

This study utilizes Self-Determination Theory (SDT) to illustrate how a supportive learning environment enhances employees' intrinsic motivation. SDT identifies competence, autonomy, and relatedness as crucial for self-determined motivation (Deci et al., 2017). The study posits that intrinsic motivation mediates the relationship between E-Training Quality (ETQ) and knowledge-management processes. Key characteristics of the e-training environment, such as Instructor Quality, Content Quality, and Digital Infrastructure Quality, are emphasized for their role in fostering engaging learning experiences that strengthen intrinsic motivation and facilitate Knowledge Acquisition, Storage, Sharing, and Application.

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2.2 E-Training Quality and Knowledge Management

E-training leverages digital technologies to enhance employees' knowledge and performance, emphasizing the importance of a quality training environment over mere availability (Al-Fraihat et al., 2020). E-Training Quality (ETQ) is identified as a higher-order construct comprising Instructor Quality, Content Quality, and Digital Infrastructure Quality, which are interdependent for overall effectiveness (Al-Jedaiah, 2020; Cidral et al., 2018).

While previous studies have examined the link between e-training and organizational outcomes, the specific impact of ETQ on distinct knowledge management processes—Knowledge Acquisition, Storage, Sharing, and Application—remains underexplored (Abubakar et al., 2019; Lin & Huang, 2020). Understanding these processes separately allows for a clearer view of e-training's effectiveness, particularly regarding the role of Intrinsic Motivation as a mediator in achieving organizational knowledge outcomes.

2.3 E-Training Quality and Intrinsic Motivation

E-Training Quality (ETQ) consists of three key components: Instructor Quality, Content Quality, and Digital Infrastructure Quality. These elements together foster a supportive digital learning environment that enhances employees' intrinsic motivation. According to Self-Determination Theory (SDT), when instruction is effective, content is relevant, and infrastructure is reliable, learning becomes more meaningful and engaging. This approach encourages employees to engage in e-training voluntarily, rather than merely fulfilling external requirements.

H1: E-Training Quality has a significant positive effect on Intrinsic Motivation.

2.4 E-Training Quality and Knowledge Management Processes

E-Training Quality enhances knowledge-management processes by ensuring relevant content, effective instructional support, and robust digital infrastructure, which improves employee access to learning resources and the practical use of knowledge. Each knowledge-management process benefits uniquely: Knowledge Acquisition is improved through accessible resources and relevant content, enabling employees to assimilate pertinent knowledge. Knowledge Storage is supported by structured training materials that aid in the organization and retrieval of learned knowledge. Knowledge Sharing is enhanced via interactive e-training environments that foster communication and knowledge exchange among employees. Finally, Knowledge Application is strengthened when e-training provides practical resources that facilitate the application of acquired knowledge to workplace tasks. Based on these arguments, the following hypotheses are proposed:

H2: E-Training Quality has a significant positive effect on Knowledge Acquisition.

H3: E-Training Quality has a significant positive effect on Knowledge Storage.

H4: E-Training Quality has a significant positive effect on Knowledge Sharing.

H5: E-Training Quality has a significant positive effect on Knowledge Application.

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2.5 Intrinsic Motivation and Knowledge Management

Intrinsic Motivation refers to engaging in an activity for its inherent interest and satisfaction rather than for external rewards. From the perspective of Self-Determination Theory (SDT), intrinsically motivated employees are more likely to engage willingly and persistently in learning and knowledge-related activities. Accordingly, intrinsic motivation may influence different knowledge-management processes, although its contribution may vary depending on the nature of each process and the organizational context.

Intrinsic motivation can facilitate Knowledge Acquisition by encouraging employees to invest greater effort and attention in learning and acquiring new knowledge. It may also support Knowledge Storage by encouraging employees to retain and organize knowledge for future use. Similarly, intrinsic motivation can promote Knowledge Sharing by increasing employees' willingness to voluntarily exchange knowledge and experience with colleagues. However, Knowledge Application requires not only motivation but also appropriate workplace conditions, resources, and opportunities to transfer acquired knowledge into practice. the following hypotheses are proposed:

H6: Intrinsic Motivation has a significant positive effect on Knowledge Acquisition.

H7: Intrinsic Motivation has a significant positive effect on Knowledge Storage.

H8: Intrinsic Motivation has a significant positive effect on Knowledge Sharing.

H9: Intrinsic Motivation has a significant positive effect on Knowledge Application.

2.6 Mediating Role of Intrinsic Motivation in the Relationship between E-Training Quality and Knowledge Management

Intrinsic Motivation serves as a motivational mechanism through which E-Training Quality (ETQ) affects knowledge-management processes. High-quality e-training enhances employees' internal motivation for learning, which can lead to improved knowledge acquisition, storage, sharing, and application. However, the effectiveness of this mechanism can vary among these processes, especially in knowledge application, which also relies on workplace conditions and opportunities for practical application of learning. Mediation hypotheses are put forth in this context. Hypotheses are outlined accordingly.

H10: Intrinsic Motivation mediates the relationship between E-Training Quality and Knowledge Acquisition.

H11: Intrinsic Motivation mediates the relationship between E-Training Quality and Knowledge Storage.

H12: Intrinsic Motivation mediates the relationship between E-Training Quality and Knowledge Sharing.

H13: Intrinsic Motivation mediates the relationship between E-Training Quality and Knowledge Application.

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2.7 Proposed Research Model

The proposed research model conceptualizes E-Training Quality (ETQ) as a multidimensional construct, consisting of instructor quality, content quality, and digital infrastructure quality. It explores the links between e-training quality, intrinsic motivation, and four knowledge-management processes: acquisition, storage, sharing, and application. Intrinsic motivation acts as a mediator in the relationships between e-training quality and these processes, including both direct and indirect associations.

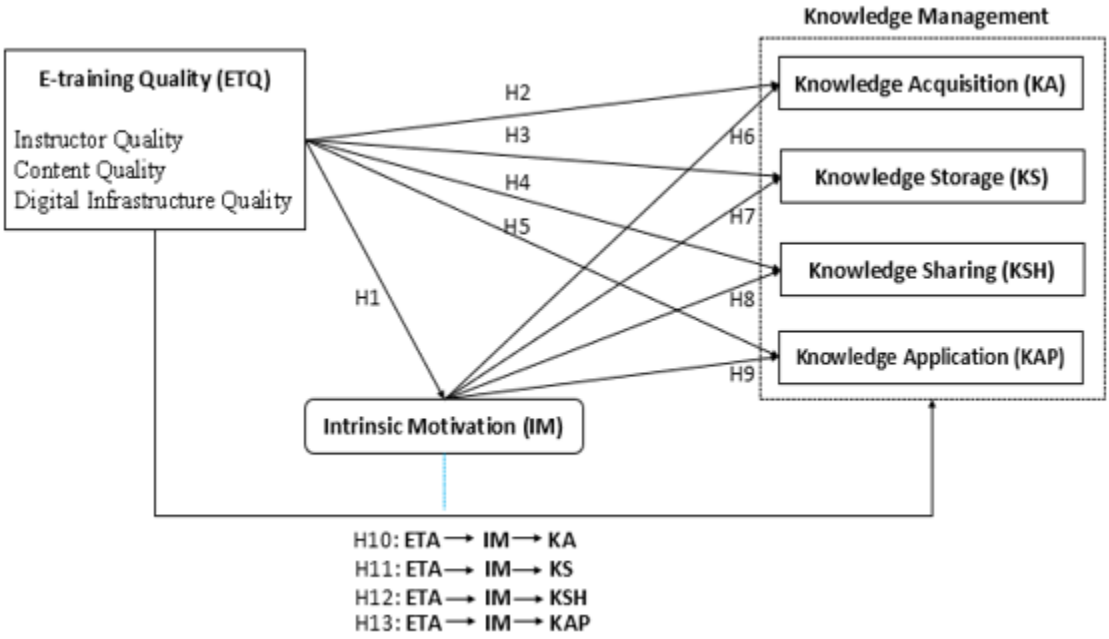

Fig 3.1: Research Model

3. METHODOLOGY

3.1 Research Design and Approach

A quantitative cross-sectional research design was used to examine the proposed relationships. Data were collected through a structured questionnaire administered to employees in three major telecommunications companies in Jordan: Zain, Orange, and Umniah. Partial least squares structural equation modelling (PLS-SEM) was used because the study examines multiple latent constructs, a formative higher-order construct, and mediation relationships within a predictive model. The analysis was conducted using SmartPLS 4.

3.2 Population and Sampling Method

The study focused on employees from three telecommunications companies in Jordan: Zain Jordan, Orange Jordan, and Umniah. According to the latest workforce data, Zain Jordan employs 1,317 individuals, Orange Jordan has approximately 1,255 employees,

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and Umniah's workforce consists of 1,073 employees, as reported by their Human Resources Departments. These figures reflect the total number of employees for the three companies, totaling 3,645, and do not account for those with prior e-training experience (Zain Group, 2026; Orange Jordan, 2025). The study involved employees with experience in e-training from participating companies, distributing 360 questionnaires and retaining 355 valid responses for analysis. The final sample included 118 respondents from Zain Jordan, 117 from Orange Jordan, and 120 from Umniah.

An a priori power analysis calculated that a minimum sample size of 68 respondents was necessary for the structural model, based on a medium effect size ($f^2 = 0.15$), a significance level of 0.05, and a power of 0.80 with two predictors. The final sample of 355 valid responses exceeded this requirement, ensuring adequate statistical power for estimating the proposed structural relationships.

Table 3.1: Population and Sample Distribution

Company	Number of Employees	Questionnaires distributed	Valid responses	Valid Response Rate
Zain	1317	120	118	98.3%
Orange	1255	120	117	97.5%
Umniah	1,073	120	120	100%
Total	3,645	360	355	98.6%

3.3 Data Instrument

A structured questionnaire was developed for the e-training context in the Jordanian telecommunications sector, based on validated scales and reviewed by experts for clarity. Responses were rated on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). The construct of E-Training Quality (ETQ) is formative and comprises three dimensions: Instructor Quality, Content Quality, and Digital Infrastructure Quality, which are integral to ETQ rather than independent predictors in the model. Intrinsic Motivation and the four knowledge-management processes—Knowledge Acquisition, Knowledge Storage, Knowledge Sharing, and Knowledge Application—are modeled as reflective constructs, assessed using four adapted items for each process. This approach maintains a conceptual clarity distinguishing ETQ as the predictor, Intrinsic Motivation as the mediator, and the four knowledge-management processes as outcomes, with measurement items and original sources detailed in Table 3.2..

Table 3.2: Measurement Items and Their Original Sources

Construct	Code	Item	Source
E-training Quality	ETQ		
Instructor Quality	INS1	The instructor responds promptly to my questions and concerns during e-training.	Sun et al. (2008); Özkan & Köseler (2009)
	INS2	The instructor has a positive attitude toward e-training.	Sun et al. (2008); Özkan & Köseler (2009)
	INS3	The instructor communicates and interacts effectively with participants during e-training.	Sun et al. (2008); Özkan & Köseler (2009)
	INS4	The instructor's enthusiasm about e-training stimulates my desire to learn.	Sun et al. (2008); Özkan & Köseler (2009)

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Content Quality	CQ1	The e-training content provides sufficient and relevant information for my work.	Al-Fraihat et al. (2020); adapted from Sedera et al. (2004)
	CQ2	The information and learning resources provided through e-training are easily accessible when I need them.	Al-Fraihat et al. (2020); adapted from Sedera et al. (2004)
	CQ3	The e-training content is concise, clear, and easy to understand.	Al-Fraihat et al. (2020); adapted from Sedera et al. (2004)
	CQ4	The e-training content is well organized into logical and understandable sections.	Al-Fraihat et al. (2020); adapted from Sedera et al. (2004)
Digital Infrastructure Quality	INF1	The organization provides adequate electronic infrastructure and channels to support e-training activities.	Alsabawy et al. (2013)
	INF2	The organization provides technical advice and consultancy to support e-training activities.	Alsabawy et al. (2013)
	INF3	The organization provides reliable communication infrastructure that enables employees to access and exchange information through e-training systems.	Alsabawy et al. (2013)
	INF4	The organization provides adequate technical support services for problems related to the e-training system.	Alsabawy et al. (2013)
Intrinsic Motivation	IM1	I enjoy participating in e-training activities.	Ryan et al. (1983)
	IM2	I find e-training activities interesting.	Ryan et al. (1983)
	IM3	I find participating in e-training enjoyable.	Ryan et al. (1983)
	IM4	E-training activities are fun to participate in.	Ryan et al. (1983)
Knowledge Acquisition	KA1	My organization actively seeks new knowledge from external sources.	Baytok et al. (2014)
	KA2	Employees regularly obtain useful knowledge from external sources.	Baytok et al. (2014)
	KA3	My organization systematically analyzes customer needs to acquire relevant knowledge.	Baytok et al. (2014)
	KA4	My organization acquires relevant knowledge from competitors, suppliers, customers, and other external sources.	Baytok et al. (2014)
Knowledge Storage	KS1	My organization systematically organizes and stores the knowledge it collects.	Baytok et al. (2014)
	KS2	My organization keeps its knowledge resources, manuals, and databases up to date.	Baytok et al. (2014)
	KS3	My organization maintains important knowledge in documented forms, such as documents and databases.	Baytok et al. (2014)
	KS4	My organization ensures that important work experiences are documented for future use.	Baytok et al. (2014)
Knowledge Sharing	KSH1	Employees actively share relevant knowledge and information within their departments.	Baytok et al. (2014)
	KSH2	Different departments actively share relevant knowledge and information with one another.	Baytok et al. (2014)
	KSH3	Employees and managers regularly exchange relevant knowledge and information.	Baytok et al. (2014)
	KSH4	My organization shares relevant knowledge and information with strategic partners.	Baytok et al. (2014)
Knowledge Application	KAP1	My organization applies existing knowledge to develop new solutions and improve work practices.	Baytok et al. (2014)
	KAP2	My organization effectively applies employees' knowledge in different work activities.	Baytok et al. (2014)

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	KAP3	My organization applies knowledge from external sources to improve work processes.	Baytok et al. (2014)
	KAP4	Employees apply relevant knowledge shared by other departments in their work.	Baytok et al. (2014)

3.4 Questionnaire Development and Expert Review

Prior to data collection, the questionnaire underwent review by two experienced academic experts in business administration, who suggested the removal of certain items and revisions for clarity. No pilot study was conducted before the main survey.

Table 3.3: Questionnaire Sections and Measurement Sources

Section	Constructs	No. of Items
A	Demographic information	5
B	E-training quality	12
	Instructor quality	4
	Content quality	4
	Digital infrastructure quality	4
C	Intrinsic motivation	4
D	Knowledge management	16
	Knowledge Acquisition	4
	Knowledge Storage	4
	Knowledge Sharing	4
	Knowledge Application	4
Total		32

3.5 Data Collection Procedures

Data were collected from April to May 2026 using electronic and paper questionnaires. A total of 120 questionnaires were allocated to each of the three telecommunications companies, with respondents selected based on availability. Of the 360 questionnaires distributed, 355 valid responses were received, resulting in a response rate of 98.6%. Access to the organizations was granted through an official letter from the Telecommunications Regulatory Commission (TRC), and participation was voluntary. Respondents were briefed on the study's purpose and confidentiality, with no personally identifiable information collected.

Table 3.4: Questionnaire Distribution and Response Rate

Company	Distributed	Valid Responses	Not Returned	Response Rate (%)
Zain	120	118	2	98.3
Orange	120	117	3	97.5
Umniah	120	120	0	100.0
Total	360	355	5	98.6

3.6 Data Analysis Technique

Data analysis comprised two phases: first, descriptive statistics were obtained via SPSS, including frequencies, means, standard deviations, skewness, and kurtosis. Second, SmartPLS 4 was utilized for PLS-SEM, assessing the measurement model through indicator loadings, Cronbach's alpha, composite reliability, AVE, and discriminant validity using the HTMT ratio and Fornell-Larcker criterion. The assessment of E-Training Quality

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(ETQ) as a formative higher-order construct focused on the significance and relevance of its formative dimension weights and collinearity. The structural model was evaluated through various metrics such as path coefficients, bootstrapped t-values, p-values, R^2, f^2, VIF, and mediation analysis. Hypothesis testing utilized 5,000 bootstrap subsamples with two-tailed significance testing at the 5% level. Common method bias was examined using the full collinearity VIF approach, along with procedural safeguards like voluntary participation, confidentiality, and the separation of measurement sections in the questionnaire.

Table 3.5: Full Collinearity VIF Assessment

Construct	VIF
ETQ	1.544
IM	1.413
KA	1.313
KAP	1.389
KS	1.808
KSH	2.011

Note. Full collinearity VIF values below 3.3 indicate that common method bias is unlikely to represent a substantial concern.

4. RESULTS AND DISCUSSION

This section presents the empirical results and discusses their implications for e-training quality, intrinsic motivation, and knowledge management in Jordanian telecommunications firms.

4.1 Respondents' Demographic Profile

Table 4.1: Respondents' Demographic Profile

Demographic category	Group	Frequency	Valid percent
Gender	Male	193	53.4
	Female	162	46.6
Age	21 - 30 years old	70	19.7
	31 - 40 years old	108	30.4
	41 - 50 years old	118	33.2
	> 50 years old	59	16.6
Qualification	Diploma	85	23.9
	Bachelor's degree	244	68.7
	Master's degree	18	5.1
	PhD	8	2.3
Experience	< 3 years	33	9.3
	4 - 6 years	103	29.0
	7 - 9 years	139	39.2
	> 10 years	80	22.5
Company	Zain	118	33.24
	Orange	117	32.96
	Umniah	120	33.80
Total		355	100.0

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Table 4.1 outlines the demographic characteristics of 355 valid respondents. The sample included 53.4% males and 46.6% females, with the predominant age group being 41–50 years 33.2%, followed closely by those aged 31–40 years 30.4%. Education levels indicated that most respondents held a bachelor's degree 68.7%. In terms of work experience, individuals with 7–9 years made up the largest group at 39.2%. The respondents were fairly distributed across three companies: Zain 33.24% with 118 respondents, Orange (32.96% with 117 respondents), and Umniah 33.80% with 120 respondents.

4.2 Descriptive Statistics

Table 4.2: Descriptive Statistics of the Study Constructs

Construct	N	Mean	SD	Skewness	Kurtosis
Instructor Quality (INS)	355	3.07	0.724	-0.032	-0.505
Content Quality (CQ)	355	3.07	0.763	-0.095	-0.312
Digital infrastructure quality (INF)	355	3.02	0.786	0.202	-0.299
Intrinsic Motivation (IM)	355	3.05	0.775	0.157	-0.651
Knowledge Acquisition (KA)	355	3.00	0.795	0.239	-0.752
Knowledge Application (KAP)	355	3.01	0.696	-0.186	-0.255
Knowledge Storage (KS)	355	3.03	0.775	0.103	-0.788
Knowledge Sharing (KSH)	355	3.01	0.720	0.054	-0.490

Table 4.2 summarizes descriptive statistics derived from 355 valid responses regarding various study constructs. The mean scores varied slightly, with knowledge acquisition at 3.00, and instructor quality and content quality both at 3.07. The standard deviations ranged from 0.696 to 0.795, indicating a moderate level of response variability. Skewness values fell between −0.186 and 0.239, while kurtosis values ranged from −0.788 to −0.255, no substantial departure from a reasonably symmetric distribution. Overall, these descriptive statistics reflect similar patterns of responses across the different study constructs.

4.3 Measurement Model Assessment

4.3.1 Common Method Bias Assessment

Common method bias (CMB) was evaluated using the full collinearity VIF approach, revealing VIF values between 1.313 and 2.011, with the highest for Knowledge Sharing (KSH). All values remained below the 3.3 threshold, suggesting CMB is not a significant concern, thus not threatening the validity of the PLS-SEM analyses.

Table 4.3: Full Collinearity VIF Assessment

Construct	VIF
E-Training Quality (ETQ)	1.544
Intrinsic Motivation (IM)	1.413
Knowledge Acquisition (KA)	1.313
Knowledge Application (KAP)	1.389
Knowledge Storage (KS)	1.808
Knowledge Sharing (KSH)	2.011

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4.3.2 Outer Loadings

Table 4.4: Outer Loadings

Construct	Item	Loading	Construct	Item	Loading
CQ	**CQ1**	**0.756**	KA	**KA1**	**0.769**
	CQ2	**0.821**		**KA2**	**0.816**
	CQ3	**0.827**		**KA3**	**0.826**
	CQ4	**0.829**		**KA4**	**0.789**
IM	**IM1**	**0.770**	KAP	**KAP1**	**0.826**
	IM2	**0.793**		**KAP2**	**0.803**
	IM3	**0.744**		**KAP3**	**0.738**
	IM4	**0.776**		**KAP4**	**0.771**
INF	**INF1**	**0.756**	KS	**KS1**	**0.743**
	INF2	**0.720**		**KS2**	**0.785**
	INF3	**0.821**		**KS3**	**0.768**
	INF4	**0.795**		**KS4**	**0.794**
INS	**INS1**	**0.733**	KSH	**KSH1**	**0.805**
	INS2	**0.761**		**KSH2**	**0.805**
	INS3	**0.755**		**KSH3**	**0.838**
	INS4	**0.834**		**KSH4**	**0.814**

Table 4.4 shows the outer loadings of reflective measurement constructs, with indicator loadings between 0.720 and 0.838, surpassing the 0.70 threshold. This confirms satisfactory indicator reliability, warranting retention of all items for further evaluation of internal consistency reliability and convergent validity.

4.3.3 Internal Consistency Reliability and Convergent Validity

Table 4.5: Construct Reliability and Convergent Validity

Construct	Cronbach's α	rho_A	rho_C	AVE
CQ	**0.823**	**0.829**	**0.883**	**0.654**
IM	**0.776**	**0.785**	**0.854**	**0.595**
INF	**0.777**	**0.785**	**0.856**	**0.599**
INS	**0.774**	**0.787**	**0.854**	**0.595**
KA	**0.813**	**0.818**	**0.877**	**0.640**
KAP	**0.796**	**0.811**	**0.865**	**0.617**
KS	**0.776**	**0.780**	**0.855**	**0.597**
KSH	**0.832**	**0.832**	**0.888**	**0.665**

Table 4.5 shows good internal consistency and convergent validity for all reflective constructs, with Cronbach's alpha, rho_A, and composite reliability values over 0.70. AVE values ranged from 0.595 to 0.665, surpassing the 0.50 threshold, confirming the reliability and validity of the reflective measurement model.

4.3.4 Discriminant Validity

4.3.4.1 Heterotrait-Monotrait Ratio (HTMT)

Table 4.6: Heterotrait-Monotrait Ratio

	CQ	IM	INF	INS	KA	KAP	KS	KSH
CQ								
IM	0.372							

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INF	0.484	0.570						
INS	0.775	0.404	0.595					
KA	0.385	0.544	0.322	0.467				
KAP	0.342	0.269	0.394	0.463	0.232			
KS	0.377	0.335	0.360	0.404	0.292	0.514		
KSH	0.343	0.365	0.442	0.422	0.344	0.581	0.816	

Table 4.6 indicates that all HTMT values for the reflective constructs are below the 0.85 threshold, with the highest value between Knowledge Storage (KS) and Knowledge Sharing (KSH) at 0.816. These findings validate the discriminant validity of the reflective constructs, confirming their empirical distinctness.

4.3.4.2 Fornell-Larcker Criterion

Table 4.7: Fornell-Larcker Criterion

	CQ	**IM**	**INF**	**INS**	**KA**	**KAP**	**KS**	**KSH**
CQ	0.809							
IM	0.301	0.771						
INF	0.394	0.464	0.774					
INS	0.626	0.323	0.465	0.771				
KA	0.322	0.429	0.263	0.379	0.800			
KAP	0.288	0.232	0.323	0.377	0.191	0.785		
KS	0.307	0.273	0.285	0.317	0.229	0.406	0.773	
KSH	0.286	0.302	0.358	0.346	0.283	0.478	0.655	0.816

Table 4.7 indicates that the square root of the Average Variance Extracted (AVE) for each reflective construct is greater than its correlations with other constructs, with diagonal values between 0.771 and 0.816. This supports the Fornell–Larcker criterion and confirms satisfactory discriminant validity among the reflective constructs.

4.3.5 Assessment of the Formative Higher-Order Construct

Table 4.8: Assessment of the Formative Higher-Order Construct (ETQ)

Formative Dimension	**Outer Weight (β)**	**STDEV**	**t-value**	**p-value**	**VIF**	**Decision**
Content Quality (CQ) → ETQ	0.268	0.093	2.888	0.004	1.643	Supported
Digital Infrastructure (INF) → ETQ	0.523	0.079	6.619	<0.001	1.284	Supported
Instructor Quality (INS) → ETQ	0.441	0.097	4.562	<0.001	1.771	Supported

Note. ETQ = E-Training Quality. VIF values below 3.00 indicate that collinearity among the formative dimensions is not a critical concern.

Table 4.8 indicates that Digital Infrastructure Quality ($\beta = 0.523$, $p < 0.001$), Instructor Quality ($\beta = 0.441$, $p < 0.001$), and Content Quality ($\beta = 0.268$, $p = 0.004$) all significantly contributed to E-Training Quality (ETQ), with Digital Infrastructure Quality having the strongest influence. VIF values between 1.284 and 1.771 show no critical collinearity issues, allowing retention of all three dimensions in the measurement model.

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4.4 Structural Model Assessment

4.4.1 Inner Collinearity Assessment

Table 4.9: Inner VIF Values

Endogenous Construct	Predictor	Inner VIF
Intrinsic Motivation (IM)	ETQ	1.000
Knowledge Acquisition (KA)	ETQ	1.260
	IM	1.260
Knowledge Application (KAP)	ETQ	1.260
	IM	1.260
Knowledge Storage (KS)	ETQ	1.260
	IM	1.260
Knowledge Sharing (KSH)	ETQ	1.260
	IM	1.260

Table 4.9 shows inner VIF values for the structural model, ranging from 1.000 to 1.260, which are below the 5.00 threshold. This indicates no significant collinearity among predictor constructs, confirming the model's suitability for hypothesis testing.

4.4.2 Coefficient of Determination (R^2)

Table 4.10: R^2 and Adjusted R^2 of the Endogenous Constructs

Endogenous Construct	R^2	Adjusted R^2
Intrinsic Motivation (IM)	0.236	0.229
Knowledge Acquisition (KA)	0.254	0.245
Knowledge Storage (KS)	0.153	0.144
Knowledge Sharing (KSH)	0.187	0.178
Knowledge Application (KAP)	0.175	0.165

Table 4.10 reveals that the structural model explained 23.6% of the variance in Intrinsic Motivation ($R^2 = 0.236$). For knowledge-management processes, the explained variances were 25.4% for Knowledge Acquisition, 15.3% for Knowledge Storage, 18.7% for Knowledge Sharing, and 17.5% for Knowledge Application. Knowledge Acquisition had the highest explanatory power, while Knowledge Storage had the lowest. The similar R^2 and adjusted R^2 values indicate stable estimates, suggesting limited-to-moderate explanatory power overall and the potential influence of additional factors on these processes.

4.4.3 Effect Size (f^2)

Table 4.11: Effect Size (f^2)

Predictor	Endogenous Construct	f^2	Effect Size
E-Training Quality (ETQ)	Intrinsic Motivation (IM)	**0.260**	Medium
E-Training Quality (ETQ)	Knowledge Acquisition (KA)	**0.055**	Small
Intrinsic Motivation (IM)	Knowledge Acquisition (KA)	**0.109**	Small
E-Training Quality (ETQ)	Knowledge Sharing (KS)	**0.086**	Small
Intrinsic Motivation (IM)	Knowledge Sharing (KS)	**0.014**	Negligible
E-Training Quality (ETQ)	KSH	**0.113**	Small
Intrinsic Motivation (IM)	KSH	**0.019**	Negligible

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E-Training Quality (ETQ)	Knowledge Application (KAP)	**0.129**	Small
Intrinsic Motivation (IM)	Knowledge Application (KAP)	**0.002**	Negligible

Table 4.11 presents the effect sizes of the structural relationships. ETQ showed a medium effect on Intrinsic Motivation ($f^2 = 0.260$) and small effects on Knowledge Acquisition ($f^2 = 0.055$), Knowledge Storage ($f^2 = 0.086$), Knowledge Sharing ($f^2 = 0.113$), and Knowledge Application ($f^2 = 0.129$).

In contrast, Intrinsic Motivation showed a small effect on Knowledge Acquisition ($f^2 = 0.109$) but negligible effects on Knowledge Storage ($f^2 = 0.014$), Knowledge Sharing ($f^2 = 0.019$), and Knowledge Application ($f^2 = 0.002$). Overall, ETQ demonstrated stronger substantive contributions across the endogenous constructs, particularly to Intrinsic Motivation, whereas the contribution of Intrinsic Motivation was comparatively limited.

4.4.4 Predictive Relevance (Q^2 predict)

Table 4.12 displays the Q^2 predict values from the PLSpredict procedure, with all endogenous constructs showing positive values between 0.125 and 0.208, suggesting out-of-sample predictive relevance.

Intrinsic Motivation had the highest value (Q^2 predict = 0.208), followed by Knowledge Sharing (0.161), Knowledge Application (0.160), Knowledge Acquisition (0.142), and Knowledge Storage (0.125).

Table 4.12: Predictive Relevance of the Endogenous Constructs

Endogenous Construct	Q^2 predict
Intrinsic Motivation (IM)	0.208
Knowledge Acquisition (KA)	0.142
Knowledge Storage (KS)	0.125
Knowledge Sharing (KSH)	0.161
Knowledge Application (KAP)	0.160

4.4.5 Model fit

Table 4.13 summarizes model-fit results, showing SRMR values of 0.060 for the saturated model and 0.072 for the estimated model, both below the acceptable 0.08 criterion. NFI values were 0.832 and 0.827, which fall short of the 0.90 level.

While d_ULS, d_G, and chi-square values are included, they require appropriate reference distributions for interpretation. Ultimately, the PLS-SEM model's adequacy is assessed through the reliability and validity of the measurement model and the structural model's performance.

Table 4.13: Model Fit Assessment

Fit Index	Saturated Model	Estimated Model
SRMR	0.060	0.072
d_ULS	2.368	3.420
d_G	1.030	1.065
Chi-square	1922.023	1971.180
NFI	0.832	0.827

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4.5 Direct Effects and Hypothesis Testing

Table 4.14: Direct Effects and Hypothesis Testing

Hypothesis	Path	β	t-value	p-value	95% CI	Decision
H1	**ETQ → IM**	**0.465**	**10.260**	**< 0.001**	[0.372, 0.549]	**Supported**
H2	**ETQ → KA**	**0.240**	**4.471**	**< 0.001**	[0.135, 0.344]	**Supported**
H3	**ETQ → KS**	**0.307**	**5.431**	**< 0.001**	[0.197, 0.417]	**Supported**
H4	**ETQ → KSH**	**0.349**	**6.400**	**< 0.001**	[0.245, 0.457]	**Supported**
H5	**ETQ → KAP**	**0.385**	**8.071**	**< 0.001**	[0.291, 0.478]	**Supported**
H6	**IM → KA**	**0.318**	**6.002**	**< 0.001**	[0.212, 0.420]	**Supported**
H7	**IM → KS**	**0.130**	**2.296**	**0.022**	[0.017, 0.238]	**Supported**
H8	**IM → KSH**	**0.140**	**2.889**	**0.004**	[0.042, 0.234]	**Supported**
H9	**IM → KAP**	**0.053**	**0.994**	**0.320**	[-0.051, 0.154]	**Not Supported**

Table 4.14 indicates that ETQ significantly positively impacted all endogenous outcomes, with the strongest effect on Intrinsic Motivation (β = 0.465, p < 0.001), followed by Knowledge Application (β = 0.385), Knowledge Sharing (β = 0.349), Knowledge Storage (β = 0.307), and Knowledge Acquisition (β = 0.240), all significant at p < 0.001. Intrinsic Motivation also significantly affected Knowledge Acquisition (β = 0.318), Knowledge Sharing (β = 0.140), and Knowledge Storage (β = 0.130), although its effect on Knowledge Application was not significant (β = 0.053). Thus, hypotheses H1–H6 and H7–H9 were supported, except for H9.

4.6 Specific Indirect Effects

Table 4.15: Specific Indirect Effects and Mediation Results

Hypothesis	Indirect Path	β	t-value	p-value	95% CI	Decision
H10	**ETQ → IM → KA**	**0.148**	**4.930**	**< 0.001**	[0.091, 0.209]	**Supported**
H11	**ETQ → IM → KS**	**0.061**	**2.185**	**0.029**	[0.004, 0.117]	**Supported**
H12	**ETQ → IM → KSH**	**0.065**	**2.767**	**0.006**	[0.020, 0.111]	**Supported**
H13	**ETQ → IM → KAP**	**0.025**	**0.982**	**0.326**	[-0.024, 0.073]	**Not Supported**

Table 4.15 reveals significant indirect effects of E-Training Quality (ETQ) on Knowledge Acquisition (β = 0.148, p < 0.001), Knowledge Storage (β = 0.061, p = 0.029), and Knowledge Sharing (β = 0.065, p = 0.006), supporting hypotheses H10, H11, and H12. However, the indirect effect on Knowledge Application was not significant (β = 0.025, p = 0.326), leading to the rejection of hypothesis H13. This indicates that Intrinsic Motivation (IM) mediates the relationship between ETQ and Knowledge Acquisition, Storage, and Sharing, but not Application.

4.7 Mediation Type and Interpretation

To determine the type of mediation, both direct and indirect effects were analyzed together. Knowledge Acquisition, Storage, and Sharing showed positive, significant results with Intrinsic Motivation (IM) indicating complementary mediation. In contrast, Knowledge Application's indirect effect was not significant, though the direct effect was, suggesting direct-only mediation.

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Table 4.16: Mediation Type and Interpretation

Relationship	Direct Effect (β)	Indirect Effect (β)	Direct Effect	Indirect Effect	Mediation Type
ETQ → IM → KA	0.240	0.148	Significant	Significant	**Complementary Mediation**
ETQ → IM → KS	0.307	0.061	Significant	Significant	**Complementary Mediation**
ETQ → IM → KSH	0.349	0.065	Significant	Significant	**Complementary Mediation**
ETQ → IM → KAP	0.385	0.025	Significant	Not significant	**No Mediation**

Table 4.16 reveals that Intrinsic Motivation (IM) partially enhances the direct effects of E-Training Quality (ETQ) on Knowledge Acquisition, Knowledge Storage, and Knowledge Sharing, with both direct and indirect effects being positive and significant. However, IM does not mediate the relationship between ETQ and Knowledge Application as the indirect effect is non-significant, despite a significant direct effect. This indicates that IM's mediating role is selective across the four knowledge-management processes.

4.8 Total effect

Table 4.17 outlines the total effects in the structural model, indicating that ETQ has significant positive effects on all knowledge-management processes. The strongest effect is noted on Knowledge Sharing (β = 0.414), followed closely by Knowledge Application (β = 0.410), Knowledge Acquisition (β = 0.387), and Knowledge Storage (β = 0.367), all significant at $p < 0.001$. ETQ also significantly impacts Intrinsic Motivation (β = 0.465, $p < 0.001$), which in turn affects Knowledge Acquisition (β = 0.318), Knowledge Sharing (β = 0.140), and Knowledge Storage (β = 0.130). The effect on Knowledge Application is not significant (β = 0.053, p = 0.320).

Table 4.17: Total Effects

Path	β	t-value	p-value	2.5%	97.5%	Decision
ETQ → IM	0.465	10.260	<0.001	0.372	0.549	Significant
ETQ → KA	0.387	8.419	<0.001	0.296	0.476	Significant
ETQ → KS	0.367	7.567	<0.001	0.270	0.461	Significant
ETQ → KSH	0.414	8.558	<0.001	0.319	0.509	Significant
ETQ → KAP	0.410	9.654	<0.001	0.324	0.491	Significant
IM → KA	0.318	6.002	<0.001	0.212	0.420	Significant
IM → KS	0.130	2.296	0.022	0.017	0.238	Significant
IM → KSH	0.140	2.889	0.004	0.042	0.234	Significant
IM → KAP	0.053	0.994	0.320	−0.051	0.154	Not significant

Note. β = standardized total effect; bootstrap = 5,000 subsamples; confidence intervals are percentile bootstrap confidence intervals; significance is assessed at $p < 0.05$.

4.9 Measurement Invariance Assessment (MICOM)

Measurement invariance was evaluated using the MICOM procedure, involving 5,000 permutations at a 5% significance level. Compositional invariance and composite means equality were confirmed across all company comparisons. Full measurement invariance

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was achieved between Zain and Orange, while partial measurement invariance was noted for Intrinsic Motivation in the Zain–Umniah (p = 0.042) and Orange–Umniah (p = 0.018) comparisons, where variance equality was not established.

Table 4.17: Summary of MICOM Results Across Companies

Company Comparison	Compositional Invariance	Equality of Mean	Equality of Variance	MICOM Result
Zain vs. Orange	Established	Established	Established	Full invariance
Zain vs. Umniah	Established	Established	Not established for IM	Partial invariance
Orange vs. Umniah	Established	Established	Not established for IM	Partial invariance

Note. MICOM was assessed using a permutation procedure with 5,000 permutations and a significance level of 0.05. Partial measurement invariance resulted from the failure to establish equality of composite variances for Intrinsic Motivation (IM).

The MICOM results demonstrate compositional invariance across company comparisons, confirming consistent measurement across groups. Full measurement invariance is noted between Zain and Orange, while partial invariance exists for Umniah due to variance differences in IM. These findings support advancing to multigroup analysis, considering partial invariance in group difference interpretations.

4.10 Out-of-Sample Predictive Assessment (PLSpredict)

Table 4.18: PLSpredict Results

Construct	PLS-SEM RMSE	LM RMSE
IM	0.893	0.884
KA	0.929	0.927
KS	0.938	0.940
KSH	0.918	0.921
KAP	0.920	0.922

Note: Positive Q^2_predict values indicate predictive relevance. Lower RMSE values indicate better predictive performance.

Table 4.18 shows that the PLS-SEM model outperforms the linear benchmark (LM) in predictive performance for Knowledge Storage, Knowledge Sharing, and Knowledge Application, indicated by lower RMSE values. However, the LM benchmark performs better for Intrinsic Motivation and Knowledge Acquisition. Overall, the PLS-SEM model demonstrates variable predictive performance across the five outcomes, with advantages for three constructs.

4.11 Permutation Multigroup Analysis (PLS-MGA)

Table 4.19. Significant Differences in Structural Paths Across Companies

Company Comparison	Structural Path	Group A β	Group B β	Δβ	p-value	Decision
Zain vs. Orange	CQ → KS	−0.002	0.415	−0.417	0.013	Significant
Zain vs. Orange	INF → IM	0.232	0.527	−0.295	0.042	Significant

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Orange vs. Umniah	CQ → KS	0.415	0.105	0.310	0.032	Significant
Orange vs. Umniah	INS → KS	−0.141	0.325	−0.466	0.008	Significant

Note. Δβ represents the difference between the path coefficients of the two groups (Group A − Group B). PLS-MGA was conducted using 5,000 permutations, a two-tailed test, and a significance level of 0.05.

Table 4.19 reveals significant differences in structural paths among three telecommunications companies. Zain showed notable differences from Orange in the paths from Content Quality to Knowledge Storage (Δβ = −0.417, p = 0.013) and Digital Infrastructure Quality to Intrinsic Motivation (Δβ = −0.295, p = 0.042). No differences were found between Zain and Umniah. Orange and Umniah exhibited significant differences in how Content Quality (Δβ = 0.310, p = 0.032) and Instructor Quality (Δβ = −0.466, p = 0.008) affect Knowledge Storage. Overall, most structural relationships are stable across the companies, but some, especially those related to Knowledge Storage, are context-dependent.

5. DISCUSSION OF FINDINGS

This section examines empirical findings concerning proposed hypotheses, theoretical frameworks, and prior research, emphasizing the role of E-Training Quality (ETQ) as a formative higher-order construct that includes Instructor Quality, Content Quality, and Digital Infrastructure Quality. It also highlights the mediating effect of Intrinsic Motivation in various knowledge-management processes.

5.1 Discussion of Direct Effects

5.1.1 Effect of E-Training Quality on Intrinsic Motivation

The findings indicate a significant positive effect of E-Training Quality on Intrinsic Motivation (β = 0.465, t = 10.260, p < 0.001; f^2 = 0.260), highlighting the importance of the overall training environment in fostering employees' intrinsic motivation. This aligns with Self-Determination Theory, suggesting that a quality e-training environment enhances voluntary engagement. The study emphasizes that factors like instructor quality, content quality, and digital infrastructure collectively influence motivation, though individual SDT needs were not assessed, limiting direct support for SDT. Thus, it provides indirect evidence for the SDT-based motivational framework without fully testing it.

5.1.2 Effect of E-Training Quality on Knowledge Acquisition

The findings support H2, indicating that E-Training Quality positively impacts Knowledge Acquisition, with a standardized coefficient of β = 0.240 and statistical significance at p < 0.001. However, the effect size is considered small, as reflected by f^2 = 0.055. This highlights that while an enhanced e-training environment does facilitate the acquisition of new knowledge among employees, the overall practical impact remains limited. Key factors include access to pertinent content, effective instructional support, and sufficient digital infrastructure, although other individual and organizational elements may also influence knowledge acquisition.

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5.1.3 Effect of E-Training Quality on Knowledge Storage

The results indicate a positive relationship between E-Training Quality and Knowledge Storage ($\beta = 0.342$), with a modest effect size ($f^2 = 0.113$). This suggests that enhanced e-training quality correlates with employees' ability to retain and organize knowledge for future use. A well-structured e-training environment offers organized content, systematic learning resources, and accessible digital platforms that aid knowledge retention. However, the small effect size implies that e-training quality alone does not fully account for knowledge storage practices. Effective knowledge storage also relies on organizational repositories, documentation procedures, information systems, and employees' readiness to document and organize knowledge. Thus, while high-quality e-training can provide essential knowledge and resources, complementary knowledge-management mechanisms are critical for systematic preservation. The findings underline the necessity of integrating e-training with organizational knowledge-storage practices, particularly in telecommunications, where training platforms should be linked with knowledge repositories and accessible databases. Overall, although E-Training Quality positively affects Knowledge Storage, its effectiveness depends on supportive technological and organizational structures.

5.1.4 Effect of E-Training Quality on Knowledge Sharing

The findings indicate a positive relationship between E-Training Quality and Knowledge Sharing, with a modest effect size ($\beta = 0.304$, $f^2 = 0.086$). Higher-quality e-training leads to increased knowledge-sharing activities, as it fosters common learning experiences, enhances communication skills, and provides digital platforms for information exchange. However, the limited effect size suggests that e-training quality alone moderately influences knowledge-sharing behavior, which is also shaped by social and organizational factors such as trust, communication, and managerial support. Thus, telecommunications organizations should not rely solely on e-training to improve knowledge sharing; instead, they should implement additional measures such as collaborative digital platforms, recognition of knowledge-sharing behaviors, and strengthened interpersonal trust to effectively transform acquired knowledge into sharing practices. In summary, E-Training Quality functions as an enabling condition for Knowledge Sharing rather than a standalone determinant.

5.1.5 Effect of E-Training Quality on Knowledge Application

The findings support H5, showing a significant positive effect of E-Training Quality (ETQ) on Knowledge Application ($\beta = 0.385$, $p < 0.001$), albeit with a small effect size ($f^2 = 0.129$). This suggests that a high-quality e-training environment enhances employees' ability to apply knowledge in the workplace. Nonetheless, the small effect size indicates that ETQ alone is not sufficient for effective knowledge application, which also relies on contextual factors like managerial support, resource availability, job autonomy, and chances to implement new knowledge. The study underscores the necessity of designing e-training programs that emphasize practical learning experiences, including pertinent content, effective instructional support, and practice opportunities, thereby enhancing the transfer

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of training outcomes into actual job practices when coupled with a supportive organizational environment.

5.1.6 Comparative Analysis of E-Training Quality Effects across Knowledge-Management Processes

The findings indicate that E-Training Quality (ETQ) significantly influences all four knowledge-management processes, with varying magnitudes of effect. The most notable impact was on Knowledge Application ($\beta = 0.385$, $f^2 = 0.129$), followed by Knowledge Sharing ($\beta = 0.349$, $f^2 = 0.113$), Knowledge Storage ($\beta = 0.307$, $f^2 = 0.086$), and Knowledge Acquisition ($\beta = 0.240$, $f^2 = 0.055$). This suggests that ETQ plays a larger role in utilizing and sharing knowledge rather than in its initial acquisition. However, the overall effects were small in practical terms, highlighting that while ETQ is a significant factor in knowledge-management outcomes, its effectiveness is likely dependent on additional organizational conditions that facilitate knowledge retention, sharing, and application within the workplace.

5.2 Effect of Intrinsic Motivation on Knowledge Management

5.2.1 Effect of Intrinsic Motivation on Knowledge Acquisition

The results indicate a positive relationship between Intrinsic Motivation and Knowledge Acquisition ($\beta = 0.325$), with a small effect size ($f^2 = 0.109$). Employees with higher intrinsic motivation are more engaged in learning activities and knowledge acquisition. According to Self-Determination Theory, those who perceive learning as meaningful are more likely to exert cognitive effort and engage with learning resources voluntarily.

Intrinsic motivation is a contributor to knowledge acquisition, but its small effect size suggests that factors like training quality, prior knowledge, individual learning capabilities, and continuous learning opportunities also play significant roles. An effective learning environment should support intrinsic motivation to enhance knowledge acquisition.

5.2.2 Effect of Intrinsic Motivation on Knowledge Storage

Intrinsic Motivation has a positive but negligible effect on Knowledge Storage ($\beta = 0.141$, $f^2 = 0.019$), indicating that while internally motivated employees tend to retain and organize knowledge, intrinsic motivation alone has limited practical significance in knowledge-storage practices.

Knowledge storage relies on organizational repositories, documentation procedures, and systems, indicating that infrastructure may be more crucial than intrinsic motivation for effective knowledge preservation and availability.

5.2.3 Effect of Intrinsic Motivation on Knowledge Sharing

The results reveal a positive yet limited relationship between Intrinsic Motivation and Knowledge Sharing ($\beta = 0.123$, $f^2 = 0.014$), indicating that while internally motivated employees may be more inclined to share knowledge, the overall impact on behavior is minimal.

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This finding highlights that knowledge sharing is heavily influenced by social and organizational factors, including trust, communication, managerial support, and organizational culture. While intrinsic motivation plays a role in facilitating knowledge sharing, an encouraging organizational environment is essential for translating that motivation into actual behavior.

5.2.4 Effect of Intrinsic Motivation on Knowledge Application

The relationship between Intrinsic Motivation and Knowledge Application is weak (β = 0.043) with a negligible effect size ($f^2 = 0.002$), indicating that internal motivation to learn does not effectively lead to the practical application of knowledge in the workplace.

Knowledge application relies heavily on contextual factors. Even if employees are motivated and knowledgeable, they may struggle to apply their learning without managerial support, resources, autonomy, appropriate work processes, or implementation opportunities. This suggests that enhancing knowledge application involves organizational mechanisms that support intrinsic motivation.

5.2.5 Comparative Analysis of Intrinsic Motivation Effects across Knowledge-Management Processes

The findings indicate that Intrinsic Motivation impacts different knowledge-management processes variably. It has the strongest influence on Knowledge Acquisition (β = 0.318, $f^2 = 0.109$), followed by Knowledge Sharing (β = 0.140, $f^2 = 0.019$) and Knowledge Storage (β = 0.130, $f^2 = 0.014$). In contrast, its effect on Knowledge Application is minimal (β = 0.053, $f^2 = 0.002$) and not statistically significant. This suggests that while intrinsic motivation promotes knowledge-oriented learning and sharing, it does not effectively facilitate the practical application of knowledge within the workplace. Therefore, factors such as organizational support, resources, autonomy, and opportunities for knowledge application may play a more crucial role in translating knowledge into practice. Overall, the study emphasizes that the influence of intrinsic motivation varies by process in the realm of knowledge management.

5.2.6 Mediating Role of Intrinsic Motivation

The mediation analysis revealed that Intrinsic Motivation (IM) mediates the relationship between E-Training Quality (ETQ) and knowledge-management outcomes, with varying effects across processes. Significant indirect effects were observed for Knowledge Acquisition, Knowledge Sharing, and KSH, while no significant effect was found for Knowledge Application. This suggests that IM acts as a more pronounced mediator for learning and knowledge-related behaviours rather than for practical knowledge application.

5.2.7 Mediating Role of Intrinsic Motivation in the Relationship between E-Training Quality and Knowledge Acquisition

The results support **H10**, showing a significant positive indirect effect of ETQ on Knowledge Acquisition through IM (β = 0.148, $t = 4.930$, $p < 0.001$; 95% CI [0.091, 0.209]). The confidence interval excludes zero, confirming the significance of the mediation effect.

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This result indicates that higher-quality e-training contributes to knowledge acquisition partly by strengthening employees' intrinsic motivation to engage in learning activities. The finding is consistent with the SDT perspective that supportive learning environments can facilitate sustained engagement. However, the complementary nature of the mediation indicates that ETQ also affects knowledge acquisition directly, suggesting that both training quality and employees' motivational responses contribute to the acquisition process

5.2.8 Mediating Role of Intrinsic Motivation in the Relationship between E-Training Quality and Knowledge Storage

The results support hypothesis H11, showing a significant indirect effect of e-training quality (ETQ) on knowledge storage through intrinsic motivation (IM) with a β of 0.061, t-value of 2.185, and p-value of 0.029, placing the 95% confidence interval between 0.004 and 0.117. This indicates that intrinsic motivation plays a partial role in influencing the relationship between e-training quality and knowledge storage. Nonetheless, the relatively small magnitude of this indirect effect suggests that motivation alone may not adequately account for effective knowledge retention and organization. Other organizational mechanisms, such as documentation practices, knowledge repositories, and systematic information management, are likely to be essential in transforming training-related knowledge into stored organizational knowledge.

5.2.9 Mediating Role of Intrinsic Motivation in the Relationship between E-Training Quality and Knowledge Sharing

The results support H12, with a significant positive indirect effect of ETQ on Knowledge Sharing through IM (β = 0.065, t = 2.767, p = 0.006; 95% CI [0.020, 0.111]). This finding suggests that e-training quality can facilitate knowledge sharing partly by strengthening employees' intrinsic motivation to engage in knowledge-related activities. Nevertheless, the relatively modest indirect effect indicates that motivation is only one component of the sharing process. Because knowledge sharing is inherently relational, factors such as communication, trust, managerial support, and a supportive knowledge-sharing climate may further determine whether motivational readiness translates into actual knowledge exchange.

5.2.10 Mediating Role of Intrinsic Motivation in the Relationship between E-Training Quality and Knowledge Application

In contrast, H13 was not supported, as the indirect effect of ETQ on Knowledge Application through IM was not significant (β = 0.025, t = 0.982, p = 0.326; 95% CI [-0.024, 0.073]). The confidence interval includes zero, indicating the absence of a significant mediation effect. This finding distinguishes motivation to learn from the capacity to apply knowledge in the workplace. Although ETQ has a significant direct effect on Knowledge Application (β = 0.385, p < 0.001), this effect does not operate significantly through intrinsic motivation. Knowledge application may therefore depend more strongly on contextual conditions such as managerial support, resource availability, job autonomy, work procedures, and opportunities to apply newly acquired knowledge.

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5.2.11 Overall Pattern of the Mediating Effects

The mediation results indicate that Intrinsic Motivation serves a selective mediating role in the relationship between E-Training Quality (ETQ) and knowledge-management processes. The most substantial indirect effect was found in Knowledge Acquisition (β = 0.148), followed by Knowledge Sharing (β = 0.065) and Knowledge Storage (β = 0.061), while the indirect effect on Knowledge Application was not significant (β = 0.025, p = 0.326). This suggests that ETQ influences Knowledge Acquisition, Knowledge Storage, and Knowledge Sharing through both direct and motivational pathways. However, Knowledge Application relies primarily on ETQ's direct effects, indicating that effective transition of training to workplace practices necessitates additional organizational and contextual factors beyond intrinsic motivation. The overall findings emphasize that intrinsic motivation is more impactful in learning and knowledge-oriented processes rather than in the practical application of knowledge.

5.3 Theoretical Implications

The findings present three key theoretical contributions. First, it conceptualizes E-Training Quality as a formative higher-order construct that combines Instructor Quality, Content Quality, and Digital Infrastructure Quality to create a comprehensive view of the e-training environment. Second, it expands on Self-Determination Theory by demonstrating that Intrinsic Motivation has varying impacts across knowledge-management processes, being more relevant for Knowledge Acquisition, Storage, and Sharing than for Knowledge Application. Third, the mediation analysis reveals a selective mediating role of Intrinsic Motivation, which enhances the effects of E-Training Quality on Knowledge Acquisition, Storage, and Sharing but does not influence Knowledge Application. Collectively, these findings endorse a process-oriented approach to knowledge management, underscoring the need for diverse motivational and organizational mechanisms across different knowledge processes.

5.4 Practical Implications

The findings indicate that telecommunications organizations ought to consider e-training as a cohesive quality system that integrates instructor quality, content quality, and digital infrastructure. While the quality of e-training has a positive impact on knowledge management processes, its influence is not uniform across outcomes; the most significant relationship is noted in Knowledge Application. To maximize the benefits of e-training, organizations should complement their investments with strategies that bolster intrinsic motivation and create workplace conditions conducive to effective knowledge transfer. This holistic approach can significantly improve e-training's role in knowledge acquisition, storage, sharing, and application.

5.5 Limitations and Future Research

This study discusses several limitations affecting its findings, including its cross-sectional design, convenience sampling, and reliance on self-reported data, which may introduce response bias. The core needs of Self-Determination Theory (SDT) were not directly

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measured, and organizational conditions affecting motivation were not captured. For future research, a longitudinal and probability-based approach is recommended to enhance causal inference and generalizability, along with a focus on integrating SDT's core needs. Telecommunications firms are urged to improve instructor quality, content relevance, and digital infrastructure, and to foster intrinsically motivating learning experiences while enhancing knowledge application and sharing resources. Combining e-training with knowledge-management systems is also suggested to better manage organizational knowledge.

6. CONCLUSIONS

This study explores the relationship between E-Training Quality, Intrinsic Motivation, and Knowledge Management in Jordan's telecommunications sector. E-Training Quality, defined as a composite of instructor quality, content quality, and digital infrastructure quality, positively impacts intrinsic motivation and enhances all four knowledge management processes: acquisition, application, storage, and sharing. Intrinsic motivation enhances knowledge acquisition, storage, and sharing but does not affect application. The research indicates that intrinsic motivation selectively mediates the relationship between E-Training Quality and specific knowledge management processes, emphasizing that training quality and employee motivation collectively influence knowledge management outcomes in varied ways. The study underscores the importance of integrating quality training practices with motivational support in telecom organizations.

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